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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/633,275

08/01/2003

Georg Zehentner

56/410

3379

757 7590 05/30/2007
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EXAMINER

VELEZ, ROBERTO

ART UNIT

PAPER NUMBER

2829

MAIL DATE

DELIVERY MODE

05/30/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/633,275	Applicant(s) ZEHENTNER ET AL.	
	Examiner Roberto Velez	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 March 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 13-16 and 19-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,7,8,10-12 and 37 is/are rejected.
- 7) ☒ Claim(s) 2-6 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/22/2003</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Species A (Claims 1-12, 17-18 and 37) in the reply filed on 03/01/2007 is acknowledged. The traversal is on the ground(s) that since the Restriction Requirement has failed to identify embodiments in Applicants' Specification that are independent and distinct, the Restriction Requirement is improper and should be withdrawn. This is not found persuasive because the Examiner pointed out in the Restriction Requirement mailed on 01/26/2007 the difference of each of the Species.
2. The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 10-11 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Kumar et al. (US Pat. 5,363,039)* in view of *Yang et al. (US PG PUB. 2003/0001537)*.

Regarding claim 1, *Kumar et al.* shows (Fig. 1) a method for error detection in a drive mechanism [10], having a multiphase electric motor [12] and a converter [14] connected upstream thereof, wherein said converter [14] controls voltages of individual phases of said electric motor [12] (Col. 3, Ln 18-

21), and individual phase currents (A, B, C) in said individual phases of said electric motor [12] each extend periodically, the method comprising: evaluating (using 120) a measured value of said measured phase current as a function of said voltage that is associated with said measured phase current (Col. 6, Ln 42-45).

Kumar et al. fails to disclose the method comprising: measuring a phase current of said electric motor at a predetermined point of a respective period; simultaneously varying a voltage that is associated with said measured phase current. However, **Yang et al.** discloses the method comprising: measuring (using 6) a phase current of said electric motor [5] at a predetermined point of a respective period (Page 2, Paragraph 0029); simultaneously varying (using 14) a voltage that is associated with said measured phase current (Page 2, Paragraph 0029).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of **Yang et al.** into the device of **Kumar et al.** by measuring a phase current of said electric motor at a predetermined point of a respective period and simultaneously varying a voltage that is associated with said measured phase current. The ordinary artisan would have been motivated to modify **Kumar et al.** in the manner set forth above for the purpose of controlling the operation of the motor while taking test measurements in order to detect any faults on the operating system.

Regarding claim 10, the combination of **Kumar et al.** and **Yang et al.** discloses everything as claimed above in claim 1; in addition; **Yang et al.** discloses wherein said voltage during said measuring said phase current is periodically varied (using 14) during said measuring (Page 2, Paragraph 0029).

Regarding claim 11, the combination of **Kumar et al.** and **Yang et al.** discloses everything as claimed above in claim 1.

The combination of **Kumar et al.** and **Yang et al.** fails to disclose wherein said voltage passes through exactly one period during said measuring.

It would have been obvious to have a voltage that passes through exactly one period during said measuring for the purpose of having enough time elapsed in order to have a the best measurement possible of the voltage and avoid erroneous measurements.

Regarding claim 37, the combination of **Kumar et al.** and **Yang et al.** discloses everything as claimed above in claim 1; in addition; **Kumar et al.** shows (Fig. 1) wherein said multiphase electric motor [12] is embodied as a three-phase motor.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Kumar et al. (US Pat. 5,363,039)** and **Yang et al. (US PG PUB. 2003/0001537)** as applied to claim 1, and further in view of **Kyodo (US Pat. 5,796,231)**.

Regarding claim 7, the combination of **Kumar et al.** and **Yang et al.** discloses everything as claimed above in claim 1.

The combination of **Kumar et al.** and **Yang et al.** fails to disclose wherein said measured phase current is equal to zero at the point of said period at which said measuring is performed. However, **Kyodo** discloses wherein said measured phase current is equal to zero at the point of said period at which said measuring is performed (Col. 23, Ln 17-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of **Kyodo** into the device of the combination of **Kumar et al.** and **Yang et al.** by having a measured phase current equal to zero at the point of said period at which said measuring is performed. The ordinary artisan would have been motivated to modify the combination of **Kumar et al.** and **Yang et al.** in the manner set forth above for the purpose of determining the frequency of the phase current.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Kumar et al. (US Pat. 5,363,039)** and **Yang et al. (US PG PUB. 2003/0001537)** as applied to claim 1, and further in view of **Prather (US Pat. 4,757,242)**.

Regarding claim 8, the combination of **Kumar et al.** and **Yang et al.** discloses everything as claimed above in claim 1; in addition, **Yang et al.** discloses said measuring takes place at a defined point of one of the periods of said individual phase currents (Page 2, Paragraph 0029).

The combination of **Kumar et al.** and **Yang et al.** fails to disclose wherein said individual phase currents are phase-shifted with respect to each other by a defined amount. However, **Prather** discloses wherein said individual phase

currents are phase-shifted with respect to each other by a defined amount (Col. 12, Ln 7-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of *Prather* into the device of the combination of *Kumar et al.* and *Yang et al.* by having individual phase currents phase-shifted with respect to each other by a defined amount. The ordinary artisan would have been motivated to modify the combination of *Kumar et al.* and *Yang et al.* in the manner set forth above for the purpose of balancing the three phase currents and having the need to only measure two phases to obtain the current values of the three phases.

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kumar et al.* (US Pat. 5,363,039) and *Yang et al.* (US PG PUB. 2003/0001537) as applied to claim 11, and further in view of *Unsworth et al.* (US Pat. 5,008,608).

Regarding claim 12, the combination of *Kumar et al.* and *Yang et al.* discloses everything as claimed above in claim 11.

The combination of *Kumar et al.* and *Yang et al.* fails to disclose wherein said voltage has a zero-crossing that extends sinusoidally. However, *Unsworth et al.* discloses wherein said voltage has a zero-crossing that extends sinusoidally (Col. 5, Ln 20-24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of *Unsworth et al.* into the device of the combination of *Kumar et al.* and *Yang et al.* by having a voltage

that has a zero-crossing. The ordinary artisan would have been motivated to modify the combination of ***Kumar et al.*** and ***Yang et al.*** in the manner set forth above for the purpose of detecting the transition of a signal waveform from positive and negative, ideally providing a narrow pulse that coincides exactly with the zero voltage condition.

8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over ***Kumar et al.*** (US Pat. 5,363,039), ***Yang et al.*** (US PG PUB. 2003/0001537), ***Unsworth et al.*** (US Pat. 5,008,608) as applied to claims 12, and further in view of ***O’Gorman et al.*** (US Pat. 6,456,946).

Regarding claim 17, the combination of ***Kumar et al.***, ***Yang et al.*** and ***Unsworth et al.*** discloses everything as claimed above in claim 12.

The combination of ***Kumar et al.***, ***Yang et al.*** and ***Unsworth et al.*** fails to disclose wherein said evaluating is performed maximum or minimum of said measured current located between a maximum or minimum and a zero-crossing of said voltage associated with said measured phase current. However, ***O’Gorman et al.*** discloses wherein said evaluating is performed maximum or minimum of said measured current located between a maximum or minimum and a zero-crossing of said voltage associated with said measured phase current (Col. 8, Ln 4-12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of ***O’Gorman et al.*** into the device of the combination of ***Kumar et al.***, ***Yang et al.*** and ***Unsworth et al.*** by

performing maximum or minimum of said measured current located between a maximum or minimum and a zero-crossing of said voltage associated with said measured phase current. The ordinary artisan would have been motivated to modify the combination of *Kumar et al.*, *Yang et al.* and *Unsworth et al.* in the manner set forth above for the purpose of using the maximum and minimum values to calculate the average value to calculate and identify a fault condition.

9. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Kumar et al.* (US Pat. 5,363,039) and *Yang et al.* (US PG PUB. 2003/0001537) as applied to claim 1, and further in view of *Healy et al.* (US Pat. 6,507,164).

Regarding claim 18, the combination of *Kumar et al.* and *Yang et al.* discloses everything as claimed above in claim 1.

The combination of *Kumar et al.* and *Yang et al.* fails to disclose wherein a value of said measured phase current is stored in the form of a table for evaluating said measured phase current. However, *Healy et al.* discloses a value of said measured phase current is stored in the form of a table for evaluating said measured phase current (Col. 8, Ln 25-30).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teachings of *Healy et al.* into the device of the combination of *Kumar et al.* and *Yang et al.* by storing a measured phase current value in the form of a table. The ordinary artisan would have been motivated to modify the combination of *Kumar et al.* and *Yang et al.* in the

manner set forth above for the purpose of organizing and recording the phase current values obtained from the test measurements for future use.

Allowable Subject Matter

10. Claims 2-6 and 9 would be allowable if rewritten to overcome the claim objection, set forth in this Office Action, and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record, taken alone or in combination, fails to disclose or render obvious, a method for error detection in a drive mechanism, having a multiphase electric motor and a converter connected upstream thereof, wherein said converter controls voltages of individual phases of said electric motor, and individual phase currents in said individual phases of said electric motor each extend periodically, the method comprising: wherein said evaluating allows distinguishing between an error in said converter and a disruption of current flow in a phase of said electric motor that corresponds to said measured phase current, as further disclosed in claim 2;

a method for error detection in a drive mechanism, having a multiphase electric motor and a converter connected upstream thereof, wherein said converter controls voltages of individual phases of said electric motor, and individual phase currents in said individual phases of said electric motor each extend periodically, the method comprising: wherein a ratio of said converter control voltages which are not equal to zero during the respective current

measurement remains constant during the measurement, and the sum of said converter control voltages is equal to zero during the measurement, as further disclosed in claim 9.

Claims 3-6 depending from claim 2 are objected for the same reason.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Roberto Velez whose telephone number is 571-272-8597. The examiner can normally be reached on Monday-Friday 8:00am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nguyen Ha can be reached on 571-272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service

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Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Roberto Velez
Patent Examiner



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